

4-1-2010

## Computer Technology Integration Into the Public School Classroom – A Qualitative Update

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### Recommended Citation

Zuniga, Ramiro (2010) "Computer Technology Integration Into the Public School Classroom – A Qualitative Update," *Academic Leadership: The Online Journal*: Vol. 8: Iss. 2, Article 14.  
DOI: 10.58809/GRIP8034  
Available at: <https://scholars.fhsu.edu/alj/vol8/iss2/14>

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# Academic Leadership Journal

## Introduction

Since the introduction of computers into the public school arena more than forty years ago, many educators have been convinced that the integration of computer technology into the public school classroom will transform education (Suppes, & Searle, 1971; Dexter, Anderson, & Becker, 2000; Woodbridge, 2004). During this time, public schools across the United States have dedicated available resources that included the allotting time for professional development and the dedication of monies toward the integration of computer technology into the public school classroom (Franklin, Turner, Kariuki, & Duran, 2001 ; Dias, 1999). To date, public schools and others involved in the process of computer technology integration have invested billions of dollars. The United States Department of Education (2007) has cited a Quality Education Data report that suggests that total spending at local, state, and Federal levels for 2003-2004 school year was 7.8 billion dollars. The Federal Government has invested over 2.8 billion dollars between 2002 and 2006 (United States Office of Management and Budget, 2007).

## Problem Statement

The number of computers found in public schools has greatly increased over the last forty years. As recognized by the National Center for Education Statistics (2000), the dramatic increase has led to a need for understanding how these computers are being used in the classroom and how teachers feel about the current state of integration. Some observers of this phenomenon have suggested that the desire to acquire computer technology for use in the public school classroom has been so strong that many of the proponents of computer technology integration into the public school classroom have spent little time in explaining or justifying it (Skinner, 2002). Cradler (2002) suggests that the superintendents and politicians who propose and fund school budgets need credible research and evaluation findings to justify sustaining and expanding funding for technology in schools.

Taking into account the resources that public schools have invested to increase the presence of computer technology in the public school classroom, one is compelled to assess the degree to which the computer technology integration phenomenon has progressed and to investigate the perspectives held by the teachers who have lived and taught through the life of this phenomenon.

## Significance of the Study

The literature shows that educators, legislators and others involved in making decisions related to computer technology integration into public schools are in need of relevant data in order to make the most informed decisions (Smarkola, 2007; Texas Center for Educational Research, 2008). This study, with its focus on teacher perspectives, can provide educators, legislators, and others involved in the process of computer technology integration into the public school classroom with useful and practical data that can be applied toward decision making related to the computer technology integration process as well as to the general body of knowledge.

## Research Questions

1. What are the perspectives of the selected participants on the current state of computer technology integration into the public school classroom based on their experience?
2. What are the common factors identified by the selected participants as having facilitated or hindered the integration of computer technology into their classroom?

## Purpose of the Study

The purpose of this study is to ascertain the level of understanding of teacher perspectives related to the current state of the integration of computer technology into the public school classroom in order to impact teaching and learning toward greater student achievement. Teacher perspectives are considered vital to the effective integration process in the school (Parr, 1999; Li, 2007) and key to how students develop their own views on the use of computer technology in the classroom (Cope & Ward, 2002). Simonsson (2004), researching computer technology usage of Hispanic bilingual teachers in southern Texas, has suggested that the use of computer technology was a function of their individual beliefs, attitudes and perceptions. This study will also bring to light an understanding of factors that have either facilitated or hindered the integration process.

## Definitions

For purposes of this study, the term computer technology includes desktop computers, laptop computers, and peripheral devices connected to such computers via a direct connection, network connection, or a wireless connection. Computer technology also includes activities conducted with the aforementioned devices, including but not limited to exchanging electronic mail, conducting Internet searches, and creating multi-media presentations.

The definition of technology integration used for this study is one provided by Dias (1999), who defines technology integration as a seamless manner to support and extend curriculum objectives and to engage students in meaningful learning. It is not something one does separately; it is part of the daily activities taking place in the classroom.

The selected school districts will be referred to as School District S, School District M, and School District L in place of using the actual name of each school district. School District S will represent the school district selected from the small sized school district category with a student enrollment of less than 1000. School District M will represent the school district selected from the medium sized school district category with a student enrollment between 1000 and less than 12,500. School District L will represent the school district selected from the large sized school district category with a student enrollment greater than 12,500.

## Assumptions

It is assumed that the assurance of anonymity and confidentiality given to each teacher prior to participating in the interview has created an environment of openness and frankness.

It is assumed that because each teacher has agreed to participate in the study after being

systematically selected, each has fully and honestly disclosed their individual lived experience during their interview. It is further assumed that each teacher has responded to the questionnaire honestly as well.

### Delimitations

The number of participants and the selection of schools within the Region One geographical area were derived from a standpoint of feasibility. The impact of computer technology integration on student achievement or any other part of the educational process is not being considered to be within the scope of this study.

### Literature Review

The literature reveals that the integration of computer technology into the public school classroom in a systematic way has been ongoing since the mid 1960s (Suppes & Searle, 1971). The literature shows the different entities that have driven the computer technology integration process into the public school classroom, the various investigations of the integration process, and the diverse views related to the integration process that have emerged. The entities documented in the literature include the federal government, state governments, and private companies that have collaboratively created a rush to acquire and integrate computer technology into the public school classroom (United States Department of Education, 2007). Various barriers to computer technology integration have been identified through these studies. Some of the more common barriers identified are: lack of time; lack of quality training; fear of computer technology; lack of computer technology equipment; and lack of instructional resources (International Association for the Evaluation of Educational Achievement, 2005; Becker, 2000; O'Connor, Goldberg, Russel, Bebell, & O'Dwyer, 2004; Littrell, Zagumny, & Zagumny; Hew & Brush, 2007). Conversely, several studies have identified factors that have facilitated computer technology integration: quality training; leadership; access to computer technology; mentoring; and others (Chanlin, 2007; Casey & Rakes, 2002; Ertmer, Addison, Lane, Ross, & Woods; Sumner & Hostetler, 1999).

The literature shows the level of commitment of the federal government, state governments, and private companies toward the attainment of computer technology for public schools. To date, billions of dollars have been invested (THE Journal, 1997; Cuban, 2001; United States Federal Communications Commissions, 2006; United States Department of Education, 2005; United States Office of Management and Budget, 2007). School district personnel have invested time toward learning new technologies and learning how to integrate these technologies into the curriculum.

Finally, the literature shows that high stakes testing, such as the Texas Assessment of Knowledge and Skills assessment program is impacting the integration of computer technology into the classroom in a negative fashion. Anderson (2009) has suggested that high stakes testing has forced teachers away from student centered innovative instructional practices in favor of traditional teacher centered practices. Teachers, as a result of high stakes testing, are concentrating on the content expected to be found in the assessment, in essence, teaching to the test (O'Neill, 2003; New York State Education Department, 2004; Vogler & Virtue, 2007). Paris and Urdan (2000) suggest that high stakes testing may also cause the erosion of teacher morale.

### Previous Perspectives, Studies, and Findings

Cuban (1994) characterized the impact of computer technology as an expanding but marginal activity in schools due to cultural beliefs held by teachers and existing organizational structure of schools for delivering instruction that worked against the integration of computer technology. Becker (2000) found that computer technology usage was more frequent in situations where an adequate number of computers were found in the classroom, as opposed to a computer lab setting, and the teacher focused on constructivist instructional practices. Expressed in his study, was a recognition that excessive curriculum content and lack of computer technology had functioned as barriers to the integration of computer technology into the classroom.

In 2001 through 2003, the Use, Support, and Effect of Instructional Technology Study [USEIT] was carried out. The study included one hundred and twenty school district administrators, one hundred and twenty two campus principals, four thousand and four hundred classroom teachers, and fourteen thousand two hundred students. The study looked at how computer technology was being utilized, the factors affecting the use of computer technology, and its affect on student learning (O'Connor, Goldberg, Russell, Bebell, & O'Dwyer, 2004). The more significant findings of this study suggested that the lower grade and middle grade teachers had greater access to computer technology in the classroom while middle and upper grades levels had access to more computer technology overall. Three quarters of the teachers indicated that they did not have access to laptop computers. Middle school and upper grade teachers reported having better technical support than the lower grade teachers. Barriers identified by the teachers were lack of computer technology; lack of practice time; lack of professional development and too much curriculum material.

Findings from a study conducted in Putnam County, Tennessee, which consisted of one hundred and sixty eight teachers responding to a fourteen item questionnaire, suggest that teachers are not ready to use computer technology appropriately (Littrell, Zagumny, & Zagumny, 2005). Reasons identified in this study include: lack of time; lack of access to computer technology; and lack of training.

In 2001, Franklin, Turner, Kariuki, and Duran identified five common barriers after having studied eight teachers and eight doctoral students: vision, access, time, assessment and professional development. These researchers suggested that teachers had no common vision and therefore did not understand how computer technology could be used within the curriculum. Lack of infrastructure within classrooms was seen to prevent access the full potential of computer technology. Lack of time for experimentation and assessment of results were also expressed as a barrier. And finally, staff development was seen to concentrate on how to use technology rather than how to integrate it into the classroom (Franklin, Turner, Kariuki, & Duran, 2001).

Casey and Rakes (2002) have suggested that increased training in computer technology integration would accelerate the acceptance of computer technology into the classroom and thus affect the teaching and learning process. Casey and Rakes further suggested that focused training would increase the comfort level of teachers and thus allow for greater integration of computer technology into the classroom.

Sandholtz and Reilly (2004) have suggested that technology standards should focus less on technical skills and more on curriculum development in an effort to provide more learning opportunities for their students. Sandholtz and Reilly also suggested that school districts provide individuals other than teachers to resolve hardware and software issues for the teachers. Finally, Sandholtz and Reilly

suggested that teachers would utilize computer technology more frequently if there were no expectation of these teachers being technically inclined.

### Methodology

The method used during the collection of data is qualitative. A series of deep interviews with a range of systematically selected teachers were used for the purpose of finding their perspectives on the integration of computer technology into the classroom. The teacher interviewing process included selecting ten teachers from each of three different sized public school districts. Each interview was carried out in a semi-structured format. This format included general questions that guided the interview as well as open ended questions intended to elicit a rich detailed account of each participant's perspective on the integration of computer technology into the public school classroom (Bogdan & Biklen, 2003). Careful attention was given to each response for the purpose of analysis. Emphasis was placed on gleaning themes, patterns, and categories. Follow-up questions were phrased, utilizing the participant's own words to probe deeper into the each individual participant's perspective and to develop a more complete understanding of their experience. This was done as per the methods presented by deMarrais and Lapan (2004) for this type of study.

### Nature of the Study

The nature of this study is phenomenological in that it intended to bring forward an understanding of perspectives based on each participant's lived experiences of the integration of computer technology into the public classroom (Bogdan & Biklen, 2003). The essence of this study is that the genuine perspective of each participant has been reached through the understanding of each individual description as it is presented by each participant (Sallis, 1982). Each individual description comes not only from physical perception: sight; sound; and feel but also from internal beliefs, emotions, memories, judgment and other personal forms of experiences (Hammond, Howarth, & Keat, 1991).

The interview was selected as the most appropriate data collection tool for this study, as teacher perspectives are not directly observable (Gall, Gall, & Borg, 2003).

### Validity and Reliability

General questions were developed as a guide for the personal interview as a measure to strengthen the validity of the interview (Bogdan & Biklen, 2003). As Bogdan and Biklen (2003) have suggested, questions were developed without a specific answer in mind. These questions allowed each interviewee to answer freely and to explore different topics when responding. Probing questions were used during the interview process in order to fully understand the context in which responses are used. The general questions were developed with consideration toward the six types of questions identified by Patton (1990): background or demographic questions; knowledge questions; experience or behavior questions; opinions or values questions; and feelings questions. An audio recording of each interview was recorded so that each response could be reviewed as needed in order to ensure a complete and thorough understanding and thus strengthen the reliability of each question (Fraenkel & Wallace, 1996).

Each respective campus was asked to provide a teacher roster from which participants would be selected. Every third teacher from the alphabetized teacher rosters was selected for participation until

the total number of teachers for each respective level was reached. A total of ten teachers were selected from the three participating schools. The ten teachers consisted of three elementary, three middle school, and four high school teachers.

### Site Selection

Three sites were selected for this study using three criteria: geographic location; grade level range; and student enrollment. Each site was selected from within Region One as defined by the Texas Education Agency (2005). Second, each district selected for this study must contain elementary, middle school, and high school grade levels. Third, one district was selected from each of the three categories defined for this study based on enrollment. Small districts have been identified as having less than 1000 student enrolled, medium districts having more than 1000 students but less than 12,500 students enrolled, and large districts having more than 12,500 students enrolled.

Region One is comprised of Webb, Zapata, Jim Hogg, Starr, Hidalgo, Willacy, and Cameron.. Within Region One, are thirty eight public school districts (Texas Education Agency, 2005). These public school districts meet the first criteria of geographic location defined for the study. From the thirty eight public school districts within Region One, four were omitted from the selection process as these school districts were not comprised of elementary, middle school, and high school grade levels and thus did not meet the second criteria. The remaining 34 school districts were then sorted in ascending order by student enrollment and categorized as either small, medium, or large school districts. For each respective category, the mean number of students enrolled was calculated from all the eligible school districts. For each respective category, a school district was selected based on the student enrollment being closest to the calculated student enrollment mean.

### Participants

Ten teachers were selected through a systematic sampling process from each of the three school districts selected for this study in order to reduce potential biases (Fraenkel & Wallen, 1996). The ten teachers selected from each participating school district consist of three elementary, three middle school, and four high school teachers. Each respective campus was asked to provide a teacher roster from which participants were selected. In order to reduce potential biases, every third teacher from an alphabetized teacher roster was selected for participation until the total of ten teachers is reached. In departmentalized rosters, every third teacher from different departments was selected for participation.

### Richness of Each Environment

Every school and every room provided evidence of progress and priorities in relation to integrating computer technology into the classroom. The inside of every classroom provided insight into the personality of each teacher. Simple posters pointed to concerns regarding the state assessments. Teacher desktops provided a glimpse into the daily tasks associated with being a public school teacher. Family photos were indicators of tradition. Every teacher shared a very important story. Each interview was found to be a good interview as defined by Bogdan & Biklen (2003) as each provided a rich and colorful personal perspective full of detail.

### Data Collection

The rich data collected during this study was collected primarily using qualitative methods through a series of in-depth interviews of public school teachers systematically selected for the purpose of finding their perspectives on the integration of computer technology into the classroom.

Thirty teachers selected for this study included ten teachers selected from each of three different sized public school districts. Each school district was selected for this study using three criteria: geographic location; grade level range; and student enrollment. The school districts selected for this included: School District S, the small sized school district, with a student enrollment of less than 1000; School District M, the medium sized school district, with a student enrollment between 1,000 and less than 12,500; and School District L, the large sized school district, with a student enrollment of more than 12,500. Each school district was selected from within Region One as defined by the Texas Education Agency (2005). Second, each district selected for this study must have elementary, middle school, and high school grade levels. Each of the teachers was asked to participate in a personal interview. Each interview was semi-structured in a format that included general guiding questions and open ended questions, as suggested by Bodgan and Biklen (2003) and Gall, Gall and Borg (2003), intended to elicit a rich detailed account of each participant's perspective on the current state of integration of computer technology into the public school classroom.

Each of the interviews was conducted in each respective teacher's classroom during her conference period in an effort to allow each teacher the comfort and security of familiar surroundings (Fraenkel & Wallen 1996). In each case, the researcher sat directly across from the teacher in close proximity. In order to establish an environment of trust, each teacher was reminded that their participation was voluntary and their responses were going to be kept confidential (Gall, Gall, & Borg, 2003). Twenty nine of the teacher interviews were conducted with the researcher and the teacher being the only ones in the classroom. One teacher allowed her husband, a fellow teacher, to sit in the classroom while the interview was conducted. The teacher's husband was merely present during the interview and did not participate in any other fashion nor did he provide any comments. The husband appeared non-attentive and did not influence the responses of his spouse, in the estimation of this researcher. All of the interviews were carried out without disruption except for that of Teacher E, from School District L, which was interrupted for about twenty minutes by a bomb threat. All discussions related to the study ceased until after the building had been cleared for reentry and both Teacher E and the researcher returned to the classroom. The interview continued and ended comfortably and seamlessly.

Using the suggested process of member checking, each participant was provided with a transcript of their respective interview and asked to review and provide corrections, if needed, in order to ensure accuracy of recorded responses (Gall, Gall, & Borg, 2003). Corrections to the transcripts were made as requested by each participant respectively.

### Data Analysis

The analysis of data collected through the interviews is based on a phenomenological strategy. This strategy allows for findings to emerge as data is reviewed both during and after the collection process (Glaser & Strauss, 1967). Through repetitive review and analysis, conceptual categories and patterns have emerged (Cassell & Symon, 2004). Through comparative analysis, categories were reviewed for similarities and differences (Glaser & Straus, 1967). Analysis and review of data occur repeatedly until additional categories, similarities, and differences could no longer be established and thus have reached theoretical saturation. The data analysis process includes meticulous and repetitive analysis



of audio recordings and interview transcripts. A state of verisimilitude was reached through the use of two instruments during the collection of data (Gall, Gall, & Borg, 2003).

Corbin and Strauss (1990; 1998) outlined specific strategies and guidelines for qualitative research based on grounded theory that included microanalysis, coding, and comparative analysis. The microanalysis stage consisted of analyzing data as it was being collected during the interviews and reading the interview transcripts thoroughly. Every bit of data was analyzed as data was being collected via the teacher interviews and, if deemed relevant, was included and explored in subsequent collections of data. During the coding stage, the researcher reviewed the interview transcriptions. In the review, the researcher isolated individual statements and pondered on how each statement, separately, conveyed an idea or concept. The researcher then labeled each identified concept expressed by each of the teachers. The researcher then carried out the comparative analysis stage in which the researcher looked at the similarities and differences in the concepts identified through the teacher interviews. It is at this stage of the analysis that findings began to emerge from the data collected.

These strategies were used during this study in order to reach greater understanding of each participant's lived experience of computer technology integration into the public school classroom.

### Perspectives on the Current State of Integration

All ten teachers from School District S indicated that their school district was not at the level of computer technology integration that it should be. This perspective is shared by teachers from the other two school districts included in this study as well as teachers in various other studies included in the literature review (CDW-G, 2005; Littrell, Zagumny, & Zagumny, 2005; Russell, O'Dwyer, Bebell, & Tao, 2007). The literature overwhelmingly supports this perspective.

The ten teachers in School District S used terms such as minimal, lacking a lot, slow process, and a little behind to describe the level of integration at which they viewed their school district to be. Terms such as these have been utilized by other researchers, such as Sandholtz and Reilly (2004), to describe the impact of computer technology on teaching and learning. Seven of the teachers expressed an awareness of computer technology that is available but not present in their district. Although one teacher indicated that the equipment in his school was state of the art, he did recognize that his comment was in the context of his school district being a small sized district. A second teacher recognized that her school district encouraged the integration of computer technology into the classroom and that teachers were well informed about computer technology but then indicated that she did not use computer technology in her classroom. A third teacher indicated that there was plenty of computer technology equipment available however she did not know how to use the equipment. The sentiments expressed by these teachers echo the statement made by the National Association of State Boards of Education (2003) suggesting that the availability of computer technology overshadowed the actual use.

Eight of the ten teachers from School District M indicated that their district had come a long way in the way of computer technology integration. Several teachers from School District M indicated that there was abundant computer technology through the use of terms such as; we've been exposing our students much more, we're coming around; you see a lot more; and we have a lot of technology. These teachers indicated that having more computer technology available created more opportunities for

exposure for teachers and students. It is notable that most of these teachers expressed having received computer technology equipment within the last year or two which falls in line with the statement by Russell, O'Dwyer, Bebell, and Tao (2007) of increase computer technology acquisition and access. One teacher indicated that the district still had a ways to go in relation to computer technology integration. A second teacher indicated that the process of computer technology in her district was a process where some teachers had to be pushed in order to begin embracing the computer technology within their classrooms. Eight of the ten teachers from School District L indicated that their district had yet to reach a high level of integration. Some of the terminology used by the teachers in their descriptions included terminology such as; a little hesitant, people are clawing and scratching and crying, and not using technology to our advantage. Many teachers have experienced similar frustrations as evidenced in previous studies. The Bill and Melinda Gates Foundation (2005) found that teachers participating in Washington State Achievers High School program had not achieved high levels of integration of computer technology due to similar frustrations. One teacher from School District L indicated that the logistics behind scheduling the use of computer technology equipment attributed to the lack of use. Wood, Mueller, Willoughby, Specht, and DeYoung, (2005) identified this specific issue as a common issue among the teachers participating in their study. Becker (2000) has suggested that teachers would increase their use of computer technology if they had several computers within their classroom as opposed to having computer technology available in a laboratory setting. A second teacher indicated that the computers in her school were used more as a reward than a tool. A third teacher indicated that she could not comment accurately on the level of integration in her district as this was only her third year of working in the district.

Out of the thirty teachers that were included in the study, nine ranked themselves between a one and three on a ten point scale or considered themselves to be beginners in terms of using computer technology. Similar rankings have been found in other studies (National Association of State Boards of Education 2003 and Zhao & Bryant, 2005). The commonality of beginners was the hesitancy to use computer technology in the classroom for instructional purposes. Eight of the thirty teachers ranked themselves between four and seven on a ten point scale or considered themselves to be moderate users of computer technology. Moderate users utilized computer technology infrequently in the classroom for instructional purposes and rarely at home. Thirteen of the teachers included in this study ranked themselves between eight and ten on a ten point scale or considered themselves to be high end users of computer technology. These teachers expressed an eagerness and high frequency of utilizing computer technology in the classroom for instructional purposes as well as at home.

A notable point is that most of the teachers interviewed for this study felt that computer technology integration into the classroom was a high priority for them personally. Twenty four or eighty percent of the teachers interviewed for this study indicated that computer technology integration was a high priority for them while six of the teachers or twenty percent indicated that computer technology integration into the classroom was not a high priority for them for various reasons.

### Finding One

It is evident that, based on the perspectives shared by the teachers from all three school districts, the level of integration of computer technology reached by each of their respective school districts is not that of full integration. This finding is supported by similar findings from previous studies. In a study of two hundred and ninety three elementary teachers conducted in Cyprus, Eteokleous (2008) suggested,

as one of the findings, that few teachers in her study were using computer technology often but rarely were they using computer technology in an innovative fashion. Keengwe, Onchwari, and Wachira (2008) in their overview of computer technology integration in education concluded that computer technology has not been successfully integrated into the curriculum. Littrell, Zagumny, & Zagumny (2005) stated, in their study of one hundred and sixty eight teachers from Tennessee, that few teachers were prepared to fully utilize computer technology in their classrooms.

### Factors Facilitating Integration

Eight of the teachers included in this study, almost twenty seven percent, identified frequent exposure or daily use of computer technology as a factor that has facilitated the integration of computers into the public classroom. Pierson (2001) identified the high frequency use of computer technology as a characteristic of teachers that had a higher level of computer technology than other teachers in her study. Five of these teachers were teachers that ranked themselves as high end users. A commonality of these five teachers is a recognition that computer technology was going to become a valuable and permanent tool in the classroom. Teacher A4 said, "I'm able to . . .to be more creative about their learning instead of just saying 'Write this down and learn this'. . .and then so it's enhanced my teaching." It was this recognition that allowed these teachers to develop an attitude which called for the embracing of computer technology. Chanlin (2007) has suggested that teachers must be willing to learn new skills and in order to reap the benefits of computer technology integration in the classroom.

Other factors identified as facilitating the integration of computer technology into the classroom were: the size of the school district; the computer technology already present in their school district; and training provided by their school district. Five of the teachers interviewed, approximately seventeen percent, indicated that the size of their school district provided an advantage toward the integration process. This perspective matches a finding in a study conducted by Wu, Hsu, and Hwang (2007) suggested teachers from small schools were more likely to use computer technology in the classroom as opposed to teachers from larger schools. Two of the teachers in School District S felt that their small sized school district was in a better position to provide more computer technology per pupil due to the lower number of students. Three of the teachers in School District L expressed their belief that the size of their school district provided a financial advantage which in turn provided more opportunities for integration of computer technology. Dawson and Rakes, (2003) however, found that size was not a factor in the level of computer technology integration in their study.

Four of the teachers interviewed, approximately thirteen percent, indicated that having computer equipment available was key in facilitating computer technology integration. Littrell, Zagumny and Zagumny (2005) suggested that this perspective was not only critical but also obvious. This perspective, however, is directly contradictory to Cuban, Kirkpatrick, and Peck's (2001) finding that access to computer does not equate to high use of computer technology by teachers.

Four of the teachers indicated that the computer technology training provided to them by their school district contributed to their integrating computer technology into their classroom.

Other factors identified, by at least one teacher but no more than three, as facilitating the integration process were: promoting technology integration by district administration; living in an urban setting; prior computer technology experience; lack of fear of computer technology; and availability of funds.

## Factors Hindering Integration

Twenty teachers, representing over sixty six percent, indicated the most common factor hindering the integration of computer technology into the classroom centered on training provided by their respective school district. Glazer, Hannafin, and Song (2005) have suggested collaborative apprenticeships as an alternative to traditional staff development. Casey and Rakes (2002) have suggested that teachers that receive continuous training are more apt to adopt computer technology into their classroom quicker than those teachers that do not receive such training. Eleven of the teachers said that the training provided was not adequate in that the training was too basic and centered on the use of the software as opposed to the actual integration of the program into classroom activities. Teacher Q said, “they have provided training in the past. . . but it’s very basic stuff.” This perspective is found throughout the literature (National Association of State Boards of Education, 2003; Franklin, Turner, Kariuki, and Duran, 2001; United States Department of Education, 2004).

Fifteen of the teachers interviewed identified lack of time as a factor that also hindered the integration of computer technology into the classroom. Teacher Z said, “. . . my day is full both at school and at home and I really don’t have the time.” Lack of time came in the shape of not having time to experiment with fellow teachers, not having time to cover curriculum contents and learn new computer skills (Franklin, Turner, Kariuki, and Duran 2001; Zhao, 2007; Hew & Brush, 2007; Smarkola, 2007).

Thirteen of the teachers, representing over forty three percent, indicated that fear was another factor hindering the integration process. Teacher Y, in referencing herself said, “I’ve been afraid to go and explore. . . I might mess it up and I don’t know how to get back. . .”

Eight teachers, almost twenty seven percent, indicated that the Texas Assessment of Knowledge and Skills assessment; the state mandated assessment program (Texas Education Agency, 2008) was a factor that has hindered the integration process. When asked why she did not spend more time integrating computer technology Teacher L stated, “. . . It’s just there’s so much to teach in the curriculum with this TAKS testing. . .” Teacher E stated, “. . . the priority at this school is passing the test, you know, the TAKS exam.” The literature is replete with evidence showing that high stakes testing has fundamentally hindered effective teaching and learning. The belief that creative instruction, in this case computer technology integration into the classroom, has suffered due to the limited instructional focus of the state assessment contents resonates in the perspectives of the teachers included in this study as well as other studies (New York State Education Department, 2004). Texas public schools have especially emerged as laboratories for high stakes tests, and teachers’ voices of discontent have become more and more common (Valenzuela, 2004). Rich instruction has been supplanted by the desire to meet a certain standard, according to test scores (McNeil, 2000). The national picture looks very much like Texas, as the national trend toward teaching to the test (Meier and Wood, 2004) has become more and more powerful. This context helps explain how the integration of computer technology is similarly impacted. To reiterate Teacher E’s statement, “The priority at this school is passing the test. . .”

Seven teachers, a roughly twenty three percent, indicated that a lack of equipment was another factor working against the integration process. Teacher I stated, “I think mainly the thing that works against it is I just don’t feel we have enough computers to service the amount of students that we have here.”

Seven teachers, approximately twenty three percent, indicated that the size of their respective district

worked against the integration process. Three of these teachers were from School District S, three from School District M, and one from School District L. Teacher A4 suggests, "I think because we're small, it is hard. I think partly because we're spread so thinly as teachers. . ."

Six teachers representing twenty percent indicated that being in a rural setting was a factor that hindered the integration process. Three of the teachers were from School District S, Three from School District M and one from School District L. Teacher O suggests, ". . . if you're in a larger city . . . you're going to hear of more." Teacher P when speaking about access to computer technology in big cities indicated, "We'll have more access to it or more information to allow to get access to it."

Other factors identified by at least one teacher but no more than two, as impeding the integration of computer technology into the classroom were: lack of instructional resources; age; change being hard; lack of technical personnel; computer repairs; and living in an urban setting.

### Finding Two

The three most significant factors identified as impeding the integration of computer technology into the public classroom center around the quality of training provided; time; and a fear of computer technology. Over sixty six percent of the teachers interviewed for this study have suggested that the training provided to them has been lacking in quality. Teachers indicated the training provided centered on the mechanics of how to use a particular piece of technology as opposed to the integration of the piece of technology into the curriculum. Bybee and Loucks-Horsley (2000) asserted that staff development was a key component that would allow teachers to convert computer technology knowledge into practice in the classroom. Simonsson (2004) suggested that it was of extreme importance that training be focused specifically on the process of integration. Zhao and Bryant (2005) suggest that staff development alone is effective solely at the basic level of computer technology integration. Fifty percent of the teachers interviewed indicated that there existed a lack of time in the instructional day to devote toward learning how to integrate computer technology into the classroom. Over forty three percent of the teachers interviewed indicated that the fear of computer technology was the third most significant factor affecting the integration process.

### Finding Three

A finding, found only in one other study reviewed during the literature review phase of this study is that of the affect state mandated testing on computer technology integration into the classroom. The state mandated assessment identified in this study was the Texas Assessment of Knowledge and Skills state assessment. Over twenty six percent of the teachers interviewed indicated that preparing for the administration of the assessment and ultimately being rated by the results of the assessment overshadowed the integration of computer technology into the classroom.

### Summary of Findings

The perspectives of the selected participants on the current state of computer technology integration into the public school classroom based on their experience suggest that full integration has yet to occur even though computer technology into the classroom is a high priority for eighty percent of the teachers. Less than half of the teachers interviewed for this study, forty three percent, ranked themselves as high end users, while fifty seven percent ranked themselves as beginners to mid level users.

The three most common factors identified by the selected participants as having hindered the integration of computer technology into their classroom center around the quality of training provided; time; and a fear of computer technology. More than sixty six percent of the teachers interviewed for this study have suggested that the training provided to them has been lacking in quality. Fifty percent of the teachers indicated that lack of time in the instructional day to devote toward learning how to integrate computer technology into the classroom also hindered the integration process. More than forty three percent of the teachers indicated that fear of computer technology affected the integration process in a negative sense as well.

More than twenty six percent of the teachers interviewed indicated that preparing for the administration of the assessment placed undue pressure on teachers. The end result was that computer technology integration into the classroom became a secondary priority.

### Implications for Practitioners

It is critical that the leaders of State Government, Federal Government, and public schools continue to work toward full integration of computer technology into the public school classroom. Thomas Friedman (2005) has reinforced that schools will continue to play an important role in the increased use of computer technology by students. Friedman said, "I really believe that the role of schools and interaction and teachers and what you called the second tier players are still going to be very, very important for a long time." He has strongly suggested that American students who do not learn how to navigate in a global economy using computer technology will not be able to compete and end up losing many opportunities to students from other parts of the world that are able to navigate (Friedman, 2007). Further, it is imperative that they exercise this influence fully.

Administrators must recognize that computer technology integration into the public school classroom is still a high priority for teachers, but yet, is far from becoming a reality. In addition, administrators, particularly principals, should recognize that their role in the potential integration of computer technology in their school can be significantly influential (Dawson & Rakes, 2003).

Administrators and teachers must develop a framework by which to carry out the integration of computer technology into the classroom. Models and standards can be utilized to establish such a framework. Models and standards can also be utilized to evaluate progress made. Administrators need to ensure that teachers fully understand the framework and how to navigate it in order to fully integrate computer technology into their classrooms.

Also, administrators need to understand the pressures associated with preparing for the state assessment (O'Neill, 2003; Vogler, 2007, Anderson, 2009). Although the Texas Education Agency (2009) has declared the intent of the state assessment program to provide educators with data on student learning for the purposes of evaluating their curriculum and identifying the academic needs of each student, there have been issues as the one brought forth by the participants of this study. It is clear that the Texas Assessment of Knowledge and Skills assessment program has affected, in a negative manner, the integration of computer technology into the classroom. Expressed clearly, by the teachers in this study, was the concern that preparing for the state assessment left little time for other worthwhile teaching activities. This particular concern has also been expressed in other studies (National Board on Educational Testing and Public Policy, 2003 & New York State Education Department, 2004).

## Recommendations for Further Study

Given the findings of this study, it is logical to suggest that further studies seek to identify computer technology integration models that may best fit the specific needs of small, medium, and large sized school districts, respectively. As Chen (2008) pointed out, it is important to find ways by which teachers can negotiate the demands of their professions so that true integration occurs.

A second recommendation for future research is a qualitative study investigating the instructional impact associated with preparing and carrying out the state mandated assessments. This researcher would strongly suggest interviewing and observing teachers for an extended period of time in order to identify the instances in which the state assessment program interferes or inhibits learning. This could lead to the redesign and restructure of the mandates of state assessment programs. This researcher has discovered, first hand, that the impact of the state assessment is far reaching, to the detriment of learning, especially for minorities (Amrein & Berliner, 2002). This researcher understands clearly some the frustrations expressed by some of the teachers included in this study.

A third recommendation for future study is the investigation of relationships between the number of computers in a school and the amount of contact time spent by students utilizing the available computer technology. Many times during this study, the researcher witnessed the obvious need for additional computer technology in many of the classrooms visited by the researcher.

A fourth recommendation for future study is the identification of a vehicle through which teachers can communicate what they think and how they feel about computer technology integration into the public school classroom. Conversation is the most important element in this study. It is this researcher's belief that survey instruments cannot measure what a teacher feels and thinks. Teaching is a human experience. Better still, teaching is a human phenomenon. Out of utmost respect for teachers, this researcher encourages deep and continued conversations not only among those who most influence our children in school but also those who most directly influence and impact the daily activities of teachers – the public school leader. Joint conversations and action are bound to create good results.

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